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JOHN MACOUN.—“The Ligneous Plants of the Dominion of Canada.”

JOHN M. COULTER.—“The Distribution of North American Umbelliferae.”

L. M. UNDERWOOD.—“The Distribution of North American Hepaticæ.”

B. D. HALSTED.—“The Migration of Weeds.”

N. L. BRITTON.—“The General Distribution of North American Plants.”

The present secretary of the section is requested to give formal notification of the persons named, and the secretary of the section for 1890 is hereby requested to give such attention to this matter as may be necessary to perfect the proposed programme by correspondence, and through the circulars of the permanent secretary of the Association.

The next meeting will be held in Indianapolis, beginning August 21.

CHARLES E. BESSEY.

ZOÖLOGY.

The Doctrine of Phagocytes.—The interest excited by the ingenious hypothesis of Metschnikoff is shown by the number of experiments made and the articles written in support or contradiction of the assumption that the mesodermal cells of the Vertebrata inherit the capacity of absorbing and destroying pathogenic bacteria from their ancestors, the unicellular Amœbæ, the mesodermic cells of Coelenterata, Turbellaria, etc. The summary of Dr. H. Bitter's recent critique of the evidence *pro* and *con* is thus presented by the *Journal of the Royal Microscopical Society*.

Unicellular lower animals, amœbæ, and also the mesodermic cells of sponges, take up small plants into their protoplasm, and digest them. In more highly organized animals this intracellular digestion becomes extracellular and fermentative; certain cells, however, still possess a capacity for picking up and dissolving foreign bodies. This contrivance is regarded by Metschnikoff as a special arrangement whereby harmful elements, especially pathogenic organisms, are prevented from penetrating the animal economy, the process being complicated by the resistance made by the parasite to digestion. Those cells which are able to digest foreign bodies are called phagocytes, and are farther subdivided into large and small. Infectious diseases are recovered

from when the phagocytes overmaster the exciting causes, and immunity after one attack or after inoculation depends on the phagocytes having become accustomed to combat the micro-organism.

This theory is supported by Metschnikoff's observations on *Daphniæ* which are attacked by a *Torula* with needle-like ascospores. These latter having been swallowed penetrate the tissues; as soon as this happens a leucocyte appears, and the spores are enveloped and destroyed. If the spore remain unattached and germinate the animal is infected. In frogs, too, anthrax bacilli are taken up by leucocytes and destroyed. At a temperature of about 30° Cent. only a few leucocytes take up the bacilli, and the animals become infected. This is explained on the hypothesis that the anthrax bacilli are more potent at this temperature, owing to their being accustomed to dealing with warm-blooded leucocytes [in the sheep]. In warm-blooded animals Metschnikoff rarely found bacilli in the leucocytes, but if the animals had been protected by a weakened virus the bacilli were picked up in quantities and destroyed. Hence it is concluded that immunity is derived from the leucocytes having got used to the poison of the bacteria.

Bacteria-eating phagocytes were also found in erysipelas and relapsing fever, and are also assumed to be present in gonorrhœa, leprosy, and tuberculosis.

According to Hess, the phagocytic privilege is shared by the cells of the splenic parenchyma, and of the liver, and Ribbert asserts that the spores of various kinds of *Aspergillus* and *Mucor* are got rid of in a similar manner. If, however, many spores be injected, the number of leucocytes may not suffice to prevent their development, and this last-mentioned author also believes that the viability of the fungi is diminished by the leucocytes cutting off the supply of oxygen. Other facts in support of the theory are, that if an animal survive the introduction of a small quantity of spores, there will be found, on a second injection, a much larger number of leucocytes, and that, as stated by Lubarsch, anthrax bacilli killed by boiling are not so quickly taken up by leucocytes in the frog as when injected in the living condition.

Against the theory are ranged numerous writers and experimenters, among whom may be mentioned Baumgarten and Weigert, who, while accepting the data, doubt the interpretation of the facts and the correctness of the hypothesis. Experiments made by C. D. Holmfeld showed that only a few bacteria were taken up by leucocytes, and that the greater number of bacteria were destroyed outside the cells.

Emmerich gives similar results; thus after inoculating rabbits with erysipelas he found that this conferred a certain immunity against subsequent inoculation with anthrax, and also that the destruction of the bacteria was chiefly extracellular, and that the phagocytes made away chiefly with the dead bacilli. Again it is noticed by the author (H. Bitter) that in none of Metschnikoff's works, nor in those of other writers, is it certainly proved that the bacteria are destroyed by phagocytes, and by these alone, and in conjunction with Nuttall he has proved this experimentally.

With regard to Metschnikoff's experiments on frogs at high temperatures, it is obvious that the fluids of the body may become so altered by the increased heat that this fluid is thereby no longer able to weaken the bacteria.

Moreover, a series of observations has shown that anthrax bacilli have always suffered some damage before they became a sacrifice to the phagocytes. On the whole the author inclines to bring in a verdict of not proven.

Physalia in the Bay of Fundy.—In the published lists of Medusæ from Grand Manan, there is no mention of the well-known Portuguese-Man-of-War, *Physalia arethusa*. I am unaware that it has ever been taken from the Bay of Fundy, and up to last summer it was unknown to the fishermen who work in these waters.

During the last summer (August, 1889) several specimens of this interesting Gulf Stream jelly-fish were taken off Grand Manan and brought to me for study. I have also learned that many others have been seen in different parts of the Bay. This unusual appearance of these visitors from the tropics is connected with the great abundance of these animals all along the New England coast during the past summer. Its presence at Grand Manan, where the pelagic fauna is decidedly Arctic, is an interesting fact, as showing how far it may straggle from waters more congenial to its life. In this connection it may not be out of place to mention the fact that these *Physaliæ* were taken near the "Ripplings," tide eddies several miles off the west coast of Grand Manan, in which is collected at certain times of the tides a most wonderful abundance of free-swimming life. These eddies, which are feeding grounds for many of the larger marine animals, are peopled by a rich variety of marine life of all kinds, brought into its vortices by the extraordinary tides for which the Bay of Fundy is famous.—J. WALTER FEWKES.

Myxine : a Protandric Hermaphrodite.—True males are extremely rare in *Myxine*. Out of several hundred specimens examined, I have recognized only very few males, and even those were unripe. The male organs are usually easy to distinguish from the ovaries ; they are generally lobate, have a milky whitish color—especially in somewhat mature state—whilst the ovaries are more translucent. Small nodules are visible in both, but the nodules of the testes (*i.e.*, the sperma-follicles) are smaller and whiter than the nodules of the ovaries (*i.e.*, the young ova). In quite an early stage there is, however, little difference between testes and ovaries : they have the same translucent appearance, and are developed only on the right side of the straight intestine. As stated by previous authors, the testis as well as the ovary is secured by a membrane (mesorchium mesoarium) to the mesentery at the point where it is fastened to the intestine.

The minute structure of the male organs will subsequently be described, but we will first examine their occurrence and extension. A feature which attracted my attention on the first superficial examination of the testes of the few true males I had been able to recognize was, that the testes were usually much more developed and prominent at their posterior than at their anterior end. The reason of that I could for some time not discover ; it will subsequently be seen that I have, perhaps, traced the cause.

But why do the males occur so extremely seldom ? Before we attempt to solve this question, let us discuss the generative organs of the large number of *Myxine* which were recognized not to be true males. On opening large specimens of *Myxine*, we generally find well developed ova in their sexual organs. If we, however, take smaller specimens of 28 to 32 cm. in length, and examine their sexual organs, we generally find that the anterior portion is but slightly prominent, and contains very small and young ova, whilst the posterior portion is often very broad and prominent, is lobate, and has a distinct whitish color along its margin, and has, in all respects, the appearance we would expect to find in a testis ; and this it really is. If we take a piece of the margin of this portion of the generative organ, tease it, and examine it in the fresh state under the microscope, we generally find abundance of spermatozoa in various stages of development. There can thus be no doubt then that that portion of the generative organ is a real male organ. It is, indeed, strange that Cunningham has so little succeeded in finding spermatazoa. Those young specimens of 28–32 cm. in length are consequently hermaphrodites, with quite immature ovaries

but well developed testes, and they must be able to perform male functions.

If we now examine, somewhat more minutely, the generative organ of the large specimens, which generally contains a number of large and well-developed ova, we find that those ova occur only in the anterior portion of the generative organ, and that the mesoarium of this portion is very broad and prominent, whilst the membrane corresponding to the mesoarium of the posterior part of the generative organ is very narrow, and carries no reproductive elements, neither ova nor spermatozoa.

If we examine specimens of *Myxine*, of sizes between that of these large females and that of the hermaphrodite previously mentioned, we will often find specimens in which the anterior portion of the generative organ is rather prominent, and contains oblong young ova, whilst the posterior portion is of testicular nature and not very prominent. These specimens seem, consequently, to be in a transitory state between male and female states. Indeed, on examining a sufficient number of specimens, we will easily be able to find every transition stage from hermaphrodite males to fully developed females; and the rule seems to be that the larger the specimen is, the more are the female organs developed, and the more do the male organs disappear.

From what has been stated above, we seem already entitled to conclude, that *Myxine* is generally or always (?) in its young state a male; whilst at a more advanced age it becomes transformed into a female. Indeed, I have not yet found a single female that did not show traces of the early male stage.

Upon the whole, it must be admitted that there is a strange irregularity in the occurrence and extension of the male and female organs in *Myxine*. *Myxine* seems to me to be an animal which, in sexual respects, is just at present in a transition stage; from what and to what it is, however, not easy to say. It seems still to be seeking, without yet reaching, that mode of reproduction which is most profitable for it in the struggle for existence.—FRIDTJOF NANSEN, in *Bergen's Museums Aarsberetning for 1888*.

Birds Killed by Electric Lights at Girard College, Philadelphia.—During the spring and fall migrations of birds many dead birds are seen near the electric towers in the grounds. In the last three weeks quite a number have been found, though not so many as last year, when a whole flock struck the electric tower at Ridge and South College avenue, in their migration to their winter quarters to the South.

It is now an established fact that most birds migrate at night, and during a dark stormy one they are more likely to be attracted by the electric light.

Among those dead or crippled were the Whip-poor-Will, *Caprimulgus vociferus* (a very rare bird with us), pewee fly catcher, *Sayornis fuscus*, American robin, *Turdus migratorius*, Maryland yellow-throat, ground warbler, *Trichas marylandica*, brown tree creeper, *Certhia familiaris*, wood thrush, *Turdus mustelinus*, white-breasted nut-hatch, *Sitta carolinensis*, hermit thrush, *Turdus solitarius*, song finch, *Melospiza melodia*, sometimes called song-sparrow.

Many woodpeckers and tree creepers are in the grounds at present, more than were ever noted before.

The downy woodpecker is busy at work making his ring of holes around the *Ulmus ruba*, red elm. The tree creepers have been his faithful assistants, though not having the power to make the holes he does. Both, no doubt, have done much good in ridding the grounds of the eggs and larva of worms that feed on the trees.

The barn owl, *Strix americana*, has put in an appearance this fall (a whole family of them). They are rare in Girard College grounds.

Quite a number of kinglets and viroes, or greenlets, were seen, but they were too shy to be approached, so they could not be named.

The Towhe ground-finch, *Pipilo erythrophthalmus*, has also paid us his visit and departed. By the length of his name he might have paid us a longer one.

The fox-colored finch, *Passerella iliaca*, and many other birds of all the species above spoken of as killed, were also seen flying around, except the Whip-poor-Will.—F. H. DANENHOUR.

Zoological News.—Coelenterata.—The greater portion of Vol. XXXI. of the Challenger Reports is occupied by E. P. Wright's and Th. Studer's account of the Alcyonaria, the Pennatulacea excepted. This report extends to 386 pages and 49 lithographic plates. All the Alcyonaria save the small family Haimeidæ, which may be primitive, tend to produce colonies by gemmæ. The Gorgonacea, in which a large number of individuals are so distributed that each receives an equal share of the nutritive supply, and favored also with a supporting skeleton, are regarded as the highest of the class.

Vermes.—*The Archiv für Naturgeschichte* for 1887, issued August 1886 (1 Band, 2 Heft) has a notice upon the fauna of Spitzbergen by Dr. W. Kükenthal, giving the results of a voyage undertaken in 1886. The work of description is divided between Dr. Marenzeller, who

takes the annelida ; Dr. E. Meyer, the terebellina ; Dr. Trauttsch, the polynoidæ ; Dr. Kükenthal, the opheliidæ ; Dr. Cobb, who describes the parasitic nematodes ; Dr. Vosseler, who works out the amphipods and isopods ; Dr. Giesbrecht, who describes the copepoda, and finally Dr. Kükenthal, who gives notice respecting *Hyperoodon rostratus* and *Beluga leucas*. A new polynoid is *Harmethoë vittata* ; and an *Ammotrypane*, two forms of *Ascaris* (one from the Beluga, the other from *Phoca barbata*), and a *Strongylus* from the beluga are described. The number of new amphipods is five.

Arthropoda.—"The Maturation of the Ovum in the Cape and New Zealand species of *Peripatus*," forms the subject of Miss Lilian Sheldon's contribution to the *Quar. Jour. Microp. Soc.*, XXX., pt. I.

Petrarca bathyactidis is the title given by Mr. H. Fowler to the curious crustacean parasite described by him in the *Quart. Jour. Microp. Soc.* XXX., pt. 2. It is a member of that family of crustacean parasites upon Anthozoa of which the only other species known are the *Laura gerardie* of Lacaze-Duthiers, and the *Synagoga mira* of Norman. The specimens were all found in the mesenteric chambers of a single *Bathyactis symmetrica* from a depth of 2300 fathoms. It seems to be an internal commensal rather than a parasite. Mr. Fowler accepts for the group the title of Ascothoracida, suggested by Lacaze-Duthiers, and states that the characters are markedly shared between the Cirripedia and the Ostracoda.

Mr. M. Narayanan, of the Biological Laboratory of Madras, furnishes figures of the external sexual organs of *Scorpio fulvipès*, which is common at Madras, and shows that the division into two parts of the genital operculum is, in this species at least, a sexual character peculiar to the male. In this species the chelæ are narrower than those of the female, but this character is not universal.

One of the most extensive entomological collections that have been made of recent years is that of Herr Frühstorfer, who has visited Ceylon in the interest of certain German museums, and, with the aid of fourteen other collectors, has now at least 25,000 coleoptera, 7000 lepidoptera, 3000 orthoptera, at least as many dragon-flies, a thousand arachnids, and a good collection of snakes of all kinds.

Mollusca.—M. Bouchon Brandely has recently inspected some of the oyster-beds of the north of France, and reports much reckless fishing. On the river Roma, near St. Malo, the industry is almost ruined ; at the Bay of St. Brieac the beds have been destroyed by the

reckless use of the dredge, and at Trequir, where the beds produce the famous Breton oyster, the fishermen, spite of all official warning, have fished to excess. Everywhere the rapacity of the dredgers and the constant disturbance of the young shells has caused a decline in the Breton oyster-beds.

Dr. E. V. Marteus describes the molluecs of Greece, collected by E. V. Ortzen. A sketch map accompanies the article, some new species are admitted, and a chart shows specific distribution. Three plates accompany the memoir.

Pisces.—Volume XXX. of the Challenger Reports also contains Dr. A. Gunther's third and concluding Report on the Fishes, the other reports being Volume I., on the shore fishes, and Volume XXII., on the deep-sea fishes. The species here contained are pelagic or ocean surface fishes, and six new forms are described. Many specimens were too immature for determination. The pelagic faunæ not only consist of truly pelagic fishes, but of deep-sea fishes which have the power of ascending to the surface, and of young and undeveloped littoral fishes driven out by currents. Forty-seven pages and six plates.

Reptilia.—A catalogue of the Chelonians, Rhyncocephalians and Crocodiles of the British Museum has been put forth by G. A. Boulenger, and is criticised by Mr. Lydekker in *Nature* of May 2. The family Crocodylidae is made the type of a super-family Emydosauria, and though Hatteria and Sphargis are replaced on account of priority by Sphenodon and Dermochelys, the families containing these forms bear the names of Hatteriidæ and Sphargidæ. The Crocodiles are divided into two genera, Crocodylus and Osteolaemus, according to the presence or absence of a forward prolongation of the nasals to divide the anterior nares; and a similar feature is made use of to separate Alligator and Caiman. The Cryptodira are made into six families, but while the Emydidae and four other families of Gray's Hand-list are included in the Testudinidae, Staurotypus and Dermatemys are made into the family Dermatemyidae, and Cinosternum and Platysternum are also erected into families. Testudo includes no less than forty-one species. Only four kinds of Chelonidae or true turtles are recognized, two species of Chelone, and two of Thalassochelys.

The aquatic Carettochelys of New Guinea, which has no epidermal shields on the shell, is formed into a family.

Mammalia.—*The Archiv für Naturgeschichte* for 1887, issued August, 1889, contains lists of the publications relating to mamma-

logy in 1886, also those relating to ornithology for the same year (Ant. Reichenow). Dr. O. Boettger gives the herpetological works of 1886; Dr. F. Hilgendorf the ichthyological, and Drs. G. Pfeffer and W. Kobett the malacological.

Captain Fielden of the English army has discovered that the African monkey *Cercopithecus callitrichus* has become wild in the island of Barbadoes, W. I.

EMBRYOLOGY.

Extra-Ovarian Primordial Ova in the Human Embryo.—

Dr. W. Nagel¹ reports the discovery of primordial ova in the strip of epithelium which is present on the outer side of the Wolffian body of human embryos. This discovery renders it pretty certain that the reproductive tissues were at one time much more extensively developed than in the present human species, probably in some premammalian type from which man and other mammalia, birds, reptiles and batrachia have descended. It is certain, at any rate, that the only living forms in which the reproductive or germinal tissue is developed throughout almost or quite the whole of the extent of the dorsal portion of the body cavity are some of the fishes. This discovery compares in importance and significance with that of Rathke made about forty years since, when that brilliant investigator announced the presence of branchial clefts during the early embryonic condition of all the higher vertebrates. Embryologists will await the publication of Dr. Nagel's completed studies upon extra-ovarian primordial ova with great interest.

Karyokinesis in Larval Amblystoma.—Last spring, through the kind offices of Miss Fanny R. M. Hitchcock, of New York City, the present writer came into the possession of a lot of the living ova

¹Ueber das Vorkommen von Primordialeiern ausserhalb der Keimdrüsenanlage beim Menschen. *Anat. Anzeiger*, IV., 1889, No. 16, pp. 496-498, 2 figs.